

CALIFORNIA ENERGY COMMISSION

BLUEPRINT

EFFICIENCY AND RENEWABLE ENERGY DIVISION

This month's issue will address residential LED lighting, labeling of lighting products by manufacturers, and non-regulated alterations.

Lighting Requirements for the 2008 Building Energy Efficiency Standards

The Basics of LED Lighting

The Energy Commission Hotline has received many calls from parties under the impression that a light-emitting diode (LED) light source must be certified to the Energy Commission under the 2008 *Building Energy Efficiency Standards* (Standards). This is not always true. An LED light source needs to be certified to the Energy Commission only when it is to be used as high efficacy for compliance with the residential lighting requirements in Section 150(k) of the Standards. There are additional requirements for LED trims and hybrid LED luminaires to be classified as high efficacy; those requirements will be covered briefly in this article.

LED lighting which has not been certified to the Energy Commission is treated as low efficacy and may be installed anywhere low efficacy lighting is allowed. Refer to Sections 6.4 through 6.6 of the 2008 *Residential Compliance Manual* for allowable uses of low efficacy lighting

Nonresidential Lighting

Because power input per square foot is calculated in nonresidential lighting, there is no high efficacy classification in nonresidential lighting—it is left up to the lighting designer to decide how to meet the nonresidential lighting requirements. Refer to Sections 5 and 6 of the 2008 *Nonresidential Compliance Manual* for more information on the nonresidential lighting requirements.



Definitions as used in the Standards:

- A lamp, commonly referred to as a “light bulb,” is the part of a luminaire which gives off light.
- A luminaire, commonly referred to as a “lighting fixture,” is a complete lighting unit consisting of a lamp or multiple lamps, the parts which position and protect the lamp(s), and the parts which connect the lamp(s) to a power supply.
- An LED trim, commonly referred to as a “module,” is a one-piece integral unit containing a power supply, transformer, heat sink, and LED circuit board designed to be installed into a recessed luminaire housing.

Refer to Section 150(k) of the Residential Compliance Manual for the definitions of high efficacy and low efficacy luminaires.

Certification to the Energy Commission

LED light sources which are certified to the Energy Commission as high efficacy are listed in the Energy Commission's Appliance Efficiency Database at: www.energy.ca.gov/appliances/database/

Refer to Section 6.2.9 of the Residential Compliance Manual for more information on certification of high efficacy lighting sources.

LED Trims

For the installation of an LED trim to be classified as high efficacy, all of the following requirements must be met:

- The trim must be certified to the Energy Commission.
- The trim must be hardwired directly to the luminaire housing or contain a mid-line connector which does not allow a low-efficacy lighting system to be used.
- The trim **must not** contain a screw-base socket, even if there is an adaptor which the manufacturer claims is permanent. If the trim comes from the manufacturer with a screw base attached to the end of a pigtail, the screw base must be cut off and discarded prior to hardwiring the trim directly into the luminaire housing. Performing such a modification may void the Underwriters Laboratory (UL) listing of the housing or trim. It is the manufacturer's responsibility to acquire UL listing for a modified trim.

Compliance with these requirements does not exempt a luminaire recessed in an insulated ceiling from the applicable insulation contact and airtight requirements.

Refer to Section 6.10.1 of the 2008 Residential Compliance Manual for more information.

GU-24 Luminaires

A luminaire with a factory installed GU-24 socket may be classified as high efficacy provided that all of the following requirements are met:

- The luminaire is not a recessed downlight rated to be used with a compact fluorescent lamp. (See below.)
- The luminaire does not contain any other type of line-voltage socket or lamp holder.
- The luminaire is rated for use only with high efficacy lamps (compact fluorescent or LED) or a high efficacy LED lighting source system, according to Table 150-C of the Standards.
- The manufacturer does not make available adaptors or other modular components for the luminaire which will convert the GU-24 lamp holder to any other type of socket or lamp holder.

Why are recessed downlights with GU-24 sockets not allowed to be rated for compact fluorescent lamps (CFLs)? Aren't CFLs high efficacy?

CFLs are high efficacy. Luminaire manufacturers requested that CFLs with GU-24 bases not be used in recessed downlights because GU-24 ballasts and ballast-lamp products are not currently rated for hot environments. The high temperatures in a recessed downlight can cause a non-heat-rated ballast to fail prematurely. Unless future versions of the standards allow heat-rated GU-24 products to be used, all GU-24 products will continue to not be allowed in recessed downlights.

Hybrid LED Luminaires



In the picture on the left, the luminaire's fluorescent light source is illuminated. In the picture on the right, the luminaire's LED night light is illuminated.

A hybrid LED luminaire (which contains an LED light source and another type of light source) may be classified as high efficacy if the LED light source has been certified to the Energy Commission and the other light source in the luminaire is high efficacy according to Table 150-C of the Standards.

When a hybrid LED luminaire contains a high efficacy LED light source and a low efficacy light source of another type, the LED light source will be treated as high efficacy lighting and the other light source will be treated as low efficacy lighting.

LED Light Source Wattage

If a residential kitchen contains both high and low efficacy lighting, the input power of both high and low efficacy lighting must be determined to ensure that no more than 50% of the lighting input power for the kitchen is going to low efficacy lighting. When calculating the wattage of LED lighting the following regulations apply:

- The input wattage of an LED light source shall be the maximum rated input wattage of the system, including fans, transformers, and power supply devices. The maximum rated input wattage shall be listed on a permanent, pre-printed, factory-installed label as specified by UL.
- When multiple luminaires are connected to a single power supply/driver, the following regulations apply:

- The label used to determine the maximum wattage of the LED system shall be located on the LED power supply/driver.
- The wattage of the system shall be either of the following:
 - The connected load of the LED power supply/driver as determined by the manufacturer of the luminaire.
 - The rating of the LED power supply/driver as determined by the manufacturer of the power supply/driver.

Labeling

Please note the following information regarding the labeling of lighting products:

- It is inappropriate to place a “Title 24” or “Title 24-compliant” label on a product.
- A product which has been certified by Energy Star does not automatically comply with the 2008 Building Energy Efficiency Standards.



- The California Energy Commission and the State of California do not grant endorsements. It is therefore illegal for a manufacturer to use either entity's logo anywhere, including products, packaging, and marketing materials.
- The following are examples of acceptable statements that may be included on a lighting product label:
 - “Can be used to comply with Title 24 high efficacy requirements.”
 - “Can be used to comply with Title 24 airtight requirements.”
 - “This is a high efficacy fixture according to the 2008 Title 24 Standards.”
 - “This lighting control device has been certified by the California Energy Commission for use in a Title 24 project. For more information, visit: www.energy.ca.gov/title24/

Non-Regulated Alterations

The Standards state that the replacement of parts of an existing luminaire, including installing a new ballast or new lamps, without replacing the entire luminaire, is not an alteration subject to Title 24. The following products **may only be used in projects not requiring Title 24 compliance**:

- An LED trim with a screw base
- A compact fluorescent trim with a screw base
- An LED lamp with a screw base
- A compact fluorescent lamp with a screw base
- A screw base to GU-24 adaptor

None of these products may be used in new construction, alterations, or additions needing to demonstrate compliance with Title 24.vv



Under no circumstances are GU-24 to screw base adaptors allowed.

Title 20 makes it illegal to sell or install such adaptors in California.

Building Energy Efficiency Standards Training

Links for training on issues relating to California Building Energy Efficiency Standards for Low-Rise Residential and Nonresidential/High-Rise Residential Buildings (Title 24, Part 6) are available on the Energy Commission's website at:
www.energy.ca.gov/title24/training

The Energy Commission's Energy Code Online Training:

www.energyvideos.com/

Other Energy Standards Training

For training offered by the utilities and other organizations please see the following websites:

PG&E

www.pge.com/stockton

SoCal Gas Company

<http://seminars.socalgas.com>

San Diego Gas and Electric

<http://seminars.sdge.com/int/default.asp>

SCE

www.sce.com/RebatesandSavings/EnergyCenters/workshops.htm

SMUD

www.smud.org/education/index.html

CALBO Training Institute

www.calbo.org

CABEC

www.cabec.org

Flex Your Power Newswire

www.fypower.org/news/enewswire.html



www.gosolarcalifornia.org/



Builder Energy Code Training (BECT) 2008 Title 24 code will be in effect soon, schedule a free training session to find out what it means for you. BECT will show you the changes from the 2006 to the 2008 code, as well as cost effective compliance options you can incorporate. Schedule your training and be ahead of the curve. The BECT website can be found at www.BECT.ws Contact Andrew Au at 209-473-5049 to schedule your training session.

The **effective date** for the 2008 Building Energy Efficiency Standards (Title 24, Parts 1 and 6) is **January 1, 2010.**

Arnold Schwarzenegger
Governor



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Building Standards Implementation Office

1516 Ninth Street, MS-26
Sacramento, CA
95814-5512
(916) 654-4064

BLUEPRINT

Vanessa Byrd
Supervisor
Outreach and Education Unit

Beverly Duffy
Editor/Designer

Erik Jensen
Writer

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Need Help?
Energy Standards Hotline
(800) 772-3300
or (916) 654-5106